

Claims

- 5 1. A laser multiplexing comprising a compound lens comprising at least two focusing elements arranged to focus at least two respective laser beams to a focal point on a common workpiece.
- 10 2. An element as claimed in claim 1 in which the compound lens comprises an array of lenses.
3. A laser including an element as claimed in claim 1 or claim 2.
- 15 4. A method of multiplexing laser beams comprising temporally interleaving at least two pulsed laser beams such that said beams are multiplexed independent of their state of polarisation.
- 20 5. A method as claimed in claim 4 in which at least two laser beams are spatially separated and in which a variable deviation element focuses the laser beams onto a common target area on a workpiece.
6. A method as claimed in claim 4 or claim 5 in which the variable deviation element is moveable so as to focus the temporally interleaved beams onto the common target area on a workpiece.
- 25 7. A method of multiplexing laser beams comprising the steps in any order, of spatially multiplexing laser pulses onto a common workpiece and temporally interleaving at least, some of the spatially multiplexed pulses.

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8. A method as claimed in claim 7 further comprising temporally overlapping at least some of the pulses.
- 5 9. A laser multiplexing apparatus comprising at least two pulsed laser sources for generating pulsed laser beams and a temporal multiplexing element arranged to temporally interleave at least two pulsed laser beams.
- 10 10. An apparatus as claimed in claim 9 in which the temporal multiplexing element comprises a variable deviation element.
11. An apparatus as claimed in claim 10 in which the variable deviation element comprises a moveable reflector or wedge.
- 15 12. An apparatus as claimed in claim 10 in which the variable deviation element comprises a moveable refractor.
13. An apparatus as claimed in claim 10 in which the variable deviation element comprises a moveable diffractive element.
- 20 14. An apparatus as claimed in claim 10 in which the variable deviation element has a number of reflective surfaces being an integer number of the number of laser sources being multiplexed.
- 25 15. An apparatus as claimed in any of claims 9 to 14 further comprising a laser multiplexing element as claimed in any of claims 1 to 3.
16. A high power laser produced plasma generation apparatus comprising a laser as claimed in any of claims 1 to 3 and/or an apparatus as claimed in any of claims 9 to 14.

17. A laser plasma production apparatus comprising a laser as claimed in any of claims 1 to 3 or a laser apparatus as claimed in any of claims 9 to 14.
- 5 18. A method of multiplexing laser beams comprising the steps of directing pulsed laser light from two or more independent lasers onto a movable deviation element and moving said element at a rate such that deviation of a laser pulse between lead and trailing edge is minimised.
- 10 19. A laser multiplexing assembly comprising a beam shaping element in which the beam shaping element is arranged to direct a first laser beam along an axis common with a second laser beam axis onto a common focusing element arranged about said common axis.
- 15 20. An assembly as claimed in claim 19 in which the beam shaping element is arranged to spatially separate the first and second beams.
21. An assembly as claimed in claim 19 or 20 in which the beam shaping element is formed of a lens.
- 20 22. An assembly as claimed in claim 21 in which the lens is an axicon lens.
23. A method of multiplexing laser beams comprising the steps of directing a first laser beam along an axis common with a second laser beam axis onto a common focusing element arranged about said common axis.
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